

LFU04 - SOP Examination of Latent Print Evidence

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1. Scope

- 1.1 This standard operating procedure utilizes the ACE-V (Analysis, Comparison, Evaluation, and Verification) methodology, which is used to examine latent fingerprint evidence. The methodology employs guidelines and procedures which have been devised by, promulgated by, and sanctioned by a shared consensus of the discipline's practitioners. This methodology assures that results are obtained in a harmonized, objective and reliable manner.

2. Background

- 2.1 To set forth the practices for documenting the examination of evidence to conform to the requirements of the Department of Forensic Sciences (DFS) Forensic Science Laboratory (FSL) Quality Assurance Manual, the accreditation standards under ISO/IEC 17025:2017, and the supplemental standards set by the FSL's accrediting body.
- 2.2 A majority of this process is taken directly from the SWGFAST Standard for the Documentation of Analysis, Comparison, Evaluation, and Verification (ACE-V) (Latent), ver. 1.0, published 2/12/2010.

3. Safety

- 3.1 Not applicable

4. Materials Required

- 4.1 Schedule of Analysis (if applicable)
- 4.2 Latent worksheets/case notes
- 4.3 Mideo CaseWorks worksheets (if applicable)

5. Standards and Controls

- 5.1 Not applicable

6. Calibration

- 6.1 Not applicable

7. Procedures

- 7.1 When friction ridge detail is examined using the ACE-V methodology, examiners' documentation shall be such that another qualified examiner can determine what was done and interpret the data.
- 7.2 Documentation
 - 7.2.1 Shall be made at or near the time of the examination and may be in the form of annotated images, narratives, worksheets, annotated legible copies, sketches, photocopies, AFIS or electronic records, or any combination of these methods.
 - 7.2.2 Documentation will be a part of the case record including copies of digital latent prints and/or physical latent lifts and/or copies of printed photographs. Refer to *LOM02 – Practices of Case Documentation and Report Writing* for information regarding hard copy or electronic administrative and technical records typically found in a case file.
 - 7.2.2.1. All original latent fingerprint evidence is stored in a separate secure room in the LFU.
 - 7.2.3 Although all examinations require documentation, the extent of the documentation is related to the type of case (decedent case versus latent print case) and complexity of the examination. The friction ridge impression alone is not sufficient documentation. The impression and/or a legible copy will have accompanying notes.

- 7.2.3.1. Annotations or markings made to the latent and/or known impressions, whether through digital imaging software or on a hardcopy, will be considered case notes and must be retained.
 - 7.2.3.1.1 Hardcopy annotations are to be added to the case file and digital annotations are to be saved to the Digital Latent Storage folder or Mideo Caseworks database, as applicable.
- 7.2.3.2 Digital images that have been processed and have an impact on the examination shall be retained within the Digital Latent Storage Folder or Mideo Caseworks database, as applicable
- 7.2.3.3 It is understood that not all information may be available to the examiner. When information is available, the relevant information will be noted.
- 7.2.4 For the purposes of this procedure “latent print” refers to a questioned friction ridge impression and “known print” refers to exemplars of friction ridge skin. Additionally, the procedure refers to the documentation of ACE-V on preserved latent prints (e.g., latent prints recovered on a lift, digital image or in a photograph).
- 7.2.5 Each area of apparent friction ridge detail that is deemed to be of value for comparison on a latent lift card, digital image, or photo, must be marked
 - 7.2.5.1 Only latent impressions that are deemed of value will be itemized.
 - 7.2.5.2 Areas of friction ridge that are not marked are inferred to be of no value, as the analyst must examine the entire item.
- 7.2.6 Analysts will analyze all latent impressions in a case unless otherwise noted in the case documentation. Even when an AFIS “hit” is attained or a manual identification is made, the analyst will ensure all remaining unidentified latents of value in the case are compared to this individual.

7.3 Analysis

- 7.3.1 The analyst will assess the latent print to determine if there is sufficient clarity to establish levels of detail available for comparison. Individual analysts’ tolerance and determinations of sufficiency depend on previous training, experience and understanding.
- 7.3.2 Many factors can affect the appearance of friction ridges and therefore the qualitative/quantitative aspects considered in all phases of the ACE-V methodology.

7.3.2.1 The following may affect the quality and clarity of friction ridge impressions and will be considered while assessing the print:

7.3.2.1.1 Substrate influences

7.3.2.1.2 Deposition pressure and movement – slippage, twisting

7.3.2.1.3 Elasticity of the skin

7.3.2.1.4 Matrix/Residue reactions – blood, oil, grease, dirt

7.3.2.1.5 Reagent/Residue reactions – development medium

7.3.2.1.6 Condition of the friction skin – creases and scars

7.3.2.2 Analysis and sufficiency decisions can be based on both the on-screen digital image and the printed hardcopy version of the latent print.

7.3.2.2.1 On-screen analysis and comparison is the preferred method due to the possible loss of quality in printed versions of digital latent prints.

7.3.3 In the event the hardcopy and digital image of the same latent produce different analysis decisions, the decision-making criteria will be documented, and the version that is deemed of value will be utilized through the examination process. Analysis documentation of a latent print will be completed prior to comparison. The quality and quantity of the information present in the latent print will dictate the extent of the documentation. At a minimum, for any latent impressions deemed to be of value, the following shall be documented in the case record:

7.3.3.1 For latents of value, anatomical source (e.g., fingerprint, palmprint), if known, should be documented on the latent lift card or hardcopy of the latent image by denoting the correct orientation of the print. In Mideo Caseworks, this should be annotated through the use of the designated tools within the workspace.

7.3.3.2 Presence of level 1 detail

7.3.3.3 Presence of level 2 detail

7.3.3.3.1 Analysts must follow the requirements outlined in SOP LFU 12 and perform full analysis on all latents of value using the GYRO tool. This analysis should be done prior to AFIS entry and before the comparison stage to avoid informational bias.

- 7.3.4 The analysis of latent prints may also include documentation of additional factors such as matrix, deposition pressure, lateral movement, rotational movement, level 3 detail, or other friction ridge skin detail (e.g., creases, scars). The inclusion of this information is at the analyst's discretion.

- 7.3.5 Copies of Latent Evidence

- 7.3.5.1 Many submitted cases contain duplicates or copies, in the form of multiple photos or photos of lifts, of latent print evidence. It is at the analyst's discretion to decide which version has the highest quality and will be used for analysis and possible comparison.

- 7.4 Comparison and Evaluation

- 7.4.1 When comparing latent prints of value, analysts will perform a side-by-side comparison of the latent print with the known prints to determine if the details and minutiae in the two prints are in agreement or disagreement based on similarity, sequence and spatial relationship. Analysts will use all levels of detail (as applicable) when performing comparisons.

- 7.4.1.1 Creases, scars and other distortions can be used to identify or exclude latent prints.

- 7.4.2 After the analyst performs the comparison and makes a tentative conclusion, they will move on to the evaluation phase where they will make a final determination as to whether the detail between the known and unknown latent print are in complete agreement.

- 7.4.2.1 Because no print is ever perfectly replicated, mental comparative measurements must be within acceptable tolerance for variations and/or distortions. This tolerance must be enough to ensure that the analyst has complete assurance that the replication is accurate.

- 7.4.3 Documentation that records the information relied upon by the case examiner during comparison, will be made for each comparison in the case record. Documentation of the comparison relies on both the latent print and known print.

- 7.4.3.1 Case examiner conclusions will be documented prior to submitting the evidence for verification.

- 7.4.3.1.1 This includes the Mideo workspace for comparisons, when applicable.

7.4.3.2 Known prints printed from the AFIS database are considered examination documentation. These prints are not considered evidence and will therefore not be itemized or documented in the Chain of Custody.

7.4.3.3 A legible copy of the known prints used for comparisons (regardless of the result (identification, exclusion, or determined to be inconclusive) will be retained in the case file.

7.4.4 Identification

When comparison results in an identification, at a minimum, the following information will be documented by the case examiner in the case file:

7.4.4.1 Unique identifier of the exemplar such as name, date of birth, assigned identification number (PDID), or reference to the specific exemplars (e.g., date of arrest, date of recording)

7.4.4.2 The specific latent impression number

7.4.4.3 The specific anatomical source (finger or palm) the identification was made to, along with the left or right side

7.4.4.4 Initials, signature, or equivalent (e.g., unique identifier, electronic signature) of examiner

7.4.4.5 Date conclusion reached

7.4.4.6 The source record for the identification conclusion. Documentation regarding the exclusion of additional known person(s) is not required following a conclusion of identification for each single impression by the case examiner. In the event additional known persons are not compared, the case notes must reflect the same.

7.4.4.7 The laboratory will include the ultimate conclusion for each impression, as determined by the examiner. If an impression has been identified, only the identifying information will be listed. Latent impressions resulting in a conclusion of exclusion and/or inconclusive will require all known persons to be included in the report.

7.4.5 Exclusion

If latent prints are not identified to the known prints and the person can confidently be excluded as being the source of the latent prints, the following information will be documented by the case examiner in the case file:

- 7.4.5.1 Specific latent friction ridge impression examined
- 7.4.5.2 Unique identifier(s) of the exemplar(s) used to reach the conclusion
- 7.4.5.3 Initials, signature, or equivalent (e.g., unique identifier, electronic signature) of examiner
- 7.4.5.4 Date conclusion reached
- 7.4.6 Inconclusive
 - 7.4.6.1 This result type can be used in the following two situations:
 - 7.4.6.1.1 Exemplar prints that are of insufficient clarity or are missing all or part of the required corresponding information for a conclusion to be reached during examination. The reason for this conclusion shall be documented within the case file.
 - 7.4.6.1.2 Complex friction ridge impressions that are of value, but a result of identification or exclusion cannot be reached after comparison.
 - 7.4.6.2 At a minimum the documentation should include:
 - 7.4.6.2.1 Unique identifier of the latent friction ridge impression examined
 - 7.4.6.2.2 Unique identifier(s) of the exemplar(s) used to reach the conclusion
 - 7.4.6.2.3 Specific anatomical source, if applicable (e.g., right thumb, left hypothenar)
 - 7.4.6.2.4 Reason the known prints are insufficient for comparison, if applicable
 - 7.4.6.2.5 If applicable, factors that may have contributed to the inability to reach a definitive conclusion. These factors can include:
 - 7.4.6.2.5.1 Substrate interference
 - 7.4.6.2.5.2 Possible distortion
 - 7.4.6.2.5.3 Quality of latent lift or photo
 - 7.4.6.2.5.4 Unexplainable discrepancies

7.4.6.2.6 Initials, signature, or equivalent (e.g., unique identifier, electronic signature) of examiner

7.4.6.2.7 Date conclusion reached

7.4.7 If additional analysis of the latent print following the examination results in new information, supplemental notes will be added and dated.

7.4.7.1 If the analyst changes the “of value” decision, this will be documented. The reason for changing the “of value” decision will also be documented. Any conclusions reached up to the point the analyst changes the “of value” decision will be documented.

7.5 Verification

7.5.1 All identifications will be verified by a second analyst.

7.5.2 Cases where all latents are determined to be no value will be verified by a second analyst.

7.5.3 At a minimum, all conclusions in 10% of each analyst’s cases will be verified on a monthly basis.

7.5.3.1 All conclusions in the case may include the following conclusions that were not previously verified, such as exclusions or inconclusive results, and/or all latents with sufficiency determinations.

7.5.4 Certain technical errors found during verification, such as erroneous exclusions and erroneous identifications, will be reported by the original analyst or verifier to the LFU Manager, Lead Scientist and/or Technical Leader. This information and their resolution will be documented and monitored to determine frequency and impact, and to identify possible training or quality issues.

7.5.5 Verifications will be documented in the case file and include:

7.5.5.1 Specific latent friction ridge impression examined

7.5.5.2 Unique identifier of the exemplar(s) used to reach the conclusion, when applicable

7.5.5.3 Anatomical source, when applicable

7.5.5.4 Conclusion of the verifying examiner

7.5.5.5 Initials, signature, or equivalent (e.g., unique identifier, electronic signature) of the verifying examiner

7.5.5.6 Date of verification

7.5.6 When the following information is available to the verifier, he or she will not have to separately document:

7.5.6.1 The specific latent friction ridge impression examined

7.5.6.2 The unique identifier of the exemplar(s), when applicable

7.5.6.3 The anatomical source, when applicable

7.5.6.4 The conclusion

7.6 Consultations

7.6.1 Consultation is an interaction between examiners regarding one or more impressions in question.

7.6.1.1 If examiners have interaction on a particular print, the consulted examiner will not be used as the verifier for that particular print.

7.6.2 Consultations that are deemed significant shall be documented in the case file and include:

7.6.2.1 Specific friction ridge impression(s) reviewed

7.6.2.2 Nature and result of the consultation (e.g., reviewed identification)

7.6.2.3 Initials, signature, or equivalent (e.g., unique identifier, electronic signature) of examiner(s)

7.6.2.4 Date of consultation

7.7 Conflict Resolution

7.7.1 Occasionally, issues may arise between the analyst and reviewer and/or verifier in results obtained or the conclusions drawn.

7.7.1.1 Verifier and Analyst will discuss the basis of the disagreement(s) and try to resolve the matter. If resolved, no further review is necessary, however 7.5.4 still must be followed, and the circumstances shall be documented in the case file.

7.7.1.2 A disagreement that cannot be resolved will be considered a conflict and should be reported to the LFU Manager, Lead Scientist and/or Technical Leader.

7.7.1.2.1 Consensus judgement may be sought.

7.7.1.2.1.1 Upon review, if the LFU Manager, Lead Scientist, and/or Technical Leader believe that a proper conclusion may be reached based upon the evidence presented, another LFU examiner will be assigned to perform the verification independently, after reassignment of the case to the primary verifier.

7.7.1.2.1.2 The original results will be maintained if verified independently by another analyst, LFU Supervisor or Technical Leader.

7.7.1.2.2 An independent examination, peer review and/or blind testing by additional examiners may be conducted.

7.7.1.3 All case documentation including original and any new case notes must be included in the case jacket. The analyst may cross-out, initial and date the pages with the original documentation and a communication log may be added to describe the change that occurred.

8. Sampling

8.1 Not applicable

9. Calculations

9.1 Not applicable

10. Uncertainty of Measurement

10.1 Not applicable

11. Limitations

11.1. The following factors affect the qualitative and quantitative aspects of friction ridge impressions. A competent examiner will understand these factors, recognize that they

occur in friction ridge impressions, and understand how they influence friction ridge impression reproducibility. These factors may cause an apparent dissimilarity between impressions from the same source. Failure to properly assess the occurrence and influence of these factors could result in misinterpretation. When applicable, the following factors must be considered in all steps of the ACE-V methodology:

- 11.1.1 Anatomical aspects including the condition of the skin (e.g., scars and warts) and the morphology of the hand and foot relative to the shape and contour of the substrate.
- 11.1.2 Transfer conditions including pressure applied during transfer, slippage, or twisting, sequence of deposition (i.e., double taps and overlays) and an understanding of the limitations of friction ridge pliability.
- 11.1.3 Transfer media including bodily secretions and contaminants (e.g., sweat, blood, paint, dirt, oil, grease).
- 11.1.4 Detection techniques that can include one or more of the following: optical (i.e., light sources and illumination techniques), physical, or chemical processing techniques.
- 11.1.5 Recording or preservation techniques, such as photography, lifting, live-scan, and ink.
- 11.1.6 Substrate (e.g., porous, non-porous, semi-porous, adhesive, smooth, rough, corrugated, pliable, or textured surfaces).
- 11.1.7 Environmental conditions (e.g. protected, unprotected, wet, dry, cold or hot).

12. Documentation

- 12.1 LFU worksheets and/or notations on latent lift cards/images
- 12.2 LFU Report of Examination
- 12.3 Mideo worksheets, if applicable

13. References

- 13.1 SWGFAST Standard for the Documentation of Analysis, Comparison, Evaluation, and Verification (ACE-V) (Latent) 2/12/10 ver. 1.0

- 13.2 SWGFAST Standard for Examining Friction Ridge Impressions and Resulting Conclusions 09/13/11 ver. 1.0
- 13.3 The National Institute of Justice Fingerprint Sourcebook (Current Version)
- 13.4 SWGFAST, Glossary, 5/8/09, ver. 2.0.
- 13.5 *Forensic Science Laboratory Quality Assurance Manual* (Current Version)
- 13.6 DFS Departmental Operations Manuals (Current Versions)
- 13.7 FSL Laboratory Operations Manuals (Current Versions)